

CE 601– MSTE [Engr. Calaque, Dario Jr. A]

1st QUIZ

INSTRUCTIONS:

- a. CHEATING IS PROHIBITED! Mind your own paper. Any act of cheating (using of cellular phones, books, and lecture materials during examination, copying answers from your seatmate, etc.) will result to failure of examination.
 - b. No borrowing of calculator.
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01. Following the dialogue of the daughter and her father

Father (Tay): Karla, since we're heading back home from the U.S., can you help me gather all the loose coins we've kept during our trip? We have different kinds—pennies, nickels, dimes, and quarters. I want to make sure we know exactly how many coins we have before we use or exchange them.

Daughter (Karla): Alright, Tay. I've gone through all of them carefully. After counting one by one, I found that we have a total of 50 coins. And you know what's interesting? We actually have twice as many quarters as nickels.

Father (Tay): Very good, Karla. You've been observant! Now that you know the total number of coins and the relationship between the quarters and nickels, can you also try to determine the total value of all these coins? That way, we'll know exactly how much money we've collected.

Daughter (Karla): Hmm... Tay, before I try to calculate that, I just thought of something. Can I buy a burger first? I've been craving one, and it only costs \$2.80.

Father (Tay): Sure, Karla, you may buy one. But I'll give you a little challenge. You can't just use any coins you want—you have to pay for the burger using only the pennies, nickels, and dimes. No quarters.

Daughter (Karla): Oh, really? Alright, I'll give it a try. Let me see... I've gathered all the pennies, nickels, and dimes together, but even when I combine everything, it still doesn't add up to \$2.80. To pay exactly, I'd still need three more quarters.

Father (Tay): I see. Then, Karla, how many quarters will be left after that?

a) 20pcs

b) 17pcs

c) 13 pcs

d) None

02. During the Winter Olympics Game in Torino, Italy, the total number of gold medals won by Germany, Canada and United States were three consecutive odd integers. Of these three countries, Germany won the most of gold medals and Canada won the fewest. If the sum of the first integer, twice the second integer, and four times the third integer is 69, find the number of gold medals won by the United States

a) United States with 9 gold medals

b) United States with 11 gold medals

c) United States with 8 gold medals

d) United States with 7 gold medals

03. In the expansion of $(x^2 + y - z^3)^8$. Find the term that involves x^2y^7

- a) $168x^2y^7$
- b) $56x^2y^7$
- c) $28x^2y^7$
- d) $8x^2y^7$**

04. Find the principal 5th root of $50(\cos 150^\circ + j\sin 150^\circ)$

- a) $1.9 + 1.1j$**
- b) $3.26 - 2.1j$
- c) $2.87 + 2.1j$
- d) $2.25 - 1.2j$

05. If equal spheres are piled in the form of a complete pyramid with an equilateral triangle as base. Find the number of spheres in a pile if each side contains four spheres.

- a) 18spheres
- b) 19spheres
- c) 20spheres**
- d) 21spheres

06. Find the difference of the 1986th and 1985th digit in the decimal equivalent to $1785/9999$ starting from the decimal point.

- a) 2
- b) 1
- c) 6**
- d) 3

07. The sum of the ages of a married couple and their four children is 40 years over the century mark. Ten years ago, the sum of the ages of the couple, the eldest child and the second child is 5decades and five years less than the sum of all (the six of them) their ages now. The father's age is 10times the age of the youngest while the mother's age is 8 times that of the youngest. The difference between the age of the second child and the sum of the ages of the third and the last child is zero, while the difference between the ages of the first child and the sum of the ages of the second and the last child is zero. How old is the eldest child?

- a) 20years old**
- b) 15years old
- c) 25years old
- d) 30years old

08. The undergraduates of a School of Engineers wished to form ranks for a parade. In ranks of 3 abreast, 2 men were left over, in ranks of 5, 4 over, in 7's, 6 over and 11's, 10 over. What is the least number of marchers there must have been?

a) 1154

b) 1043

c) 1224

d) 1503

09. A mountain climber wants to cut a rope 213 feet long into three pieces. If each piece is to be 2 feet longer than the previous one, where should he make the cuts?

a) 69 and 73

b) 70 and 73

c) 71 and 75

d) 68 and 70

10. An experience roofer can roof a house in 26 hours. A beginner roofer needs 39 hours to complete the same job. Find how long it takes for the two to do the job together.

a) 14.6hrs

b) 15.6hrs

c) 13.6hrs

d) 12.6hrs

11. In 2 minutes, a conveyor belt can move 300 pounds of recyclable aluminum from the delivery truck to storage area. A smaller belt can move the same quantity of cans the same distance in 6 minutes. If both belts are used, find how long it takes to move the cans to the storage area.

a) 1.5mins

b) 3.5mins

c) 0.5mins

d) 2.5mins

12. To stimulate his son is the pursuit of partial differential equations, a math professor offered to pay him 8dollars for every equation correctly solved and to fine him 5dollars for every incorrect solution. At the end of 26problems, neither owed any money to the other. How many did the boy solve correctly?

a) 9

b) 10

c) 12

d) 11

13. A contractor has 50 men of the same capacity at work on a job. They can complete the job in 30days, the working day being 8 hours but the contract expires in 20days. He decides to put 20 additional men. If all the men get P3 per day for a full or part day and the liquidated damages are P100 for every full or part day he requires over his contract, how many days could he finish the job?

a) 22days

b) 24days

c) 20days

d) 18days

14. Dr. Irving Weiman, who is always in a hurry, walks up an ongoing escalator at the rate of one step per second. Twenty steps bring him to the top. Next day, he goes up at two steps per second, reaching the top in 32 steps. How many steps are there in the escalator?

a) 25steps

b) 30steps

c) 60steps

d) 80steps

15. A candidate lost in an election where 400 delegates voted. The same delegates having voted again on the same question, he won one half of what he had lost before. The new majority was to the former as 9:10. How many delegates changed their minds?

a) 75

b) 65

c) 95

d) 25

16. A number is expressed by three digits which are in arithmetical progression. If the number is divided by the sum of the digits, the quotient will be 26, and if 198 be added to the number, the digits will be inverted. What is the hundred's digit?

a) 2

b) 3

c) 4

d) 5

17. Find the value of $x + y$ in the equation $(x + yi)(1 - 2i) = 7 - 4i$

a) 5

b) 4

c) 3

d) 2

18. Find the 4th term of the binomial expansion of $\left(\sqrt{x} + \frac{1}{\sqrt{y}}\right)^6$

a) $20x^{\frac{3}{2}}/y^{\frac{3}{2}}$

b) $10x^{\frac{5}{2}}/y^{\frac{5}{2}}$

c) $26x^{\frac{3}{2}}/y^{\frac{5}{2}}$

d) $16x^{\frac{5}{2}}/y^{\frac{3}{2}}$

19. The sum of the first n terms of a series is $3^{2n-1} + b$. What is the quotient of the 9th and the 7th term?

a) 71

b) 81

c) 61

d) 91

20. Solve for z.

$$(x - 2)(y - 3) = 5$$

$$(y - 3)(z - 1) = 1$$

$$(z - 1)(x - 2) = 5$$

a) 2

b) 4

c) -3

d) 7

21. A nutritionist in a hospital is arranging special diets that consist of a combination of three basic foods. It is important that patients on this diet consume exactly 340units of calcium, 180 units of iron and 220units of vitamin A each day. The amounts of these nutrients in one-ounce food are given in the following table.

	Calcium	Iron	Vitamin A
Food A	30	10	10
Food B	10	10	10
Food C	20	20	20

How many ounces each food must be used to satisfy the nutrient requirements exactly?

a) Food A = 8oz, Food B = 4oz and Food C = 2oz

b) Food A = 4oz, Food B = 2oz and Food C = 8oz

c) Food A = 8oz, Food B = 2oz and Food C = 4oz

d) Food A = 2oz, Food B = 4oz and Food C = 8oz

22. Medicare has instituted an incentive for hospitals to file their claims for reimbursement under the MALASAKIT system in a specific electronic format. Assume that the number of hospitals is steady at 1000, and that 5 and 70 hospitals switched in the first and second years, respectively. In order to plan for the upgrade of the Medicare's computer network, you must estimate the number for hospitals that will switch in each of the next 4 years. Assume Gompertz curve applies. Compute for the value of c .

Hint: $D = Le^{-ce^{-dt}}$ (Gompertz Curve)

a) 10.7683

b) 10.3768

c) 10.8376

d) 10.6837

23. The sum of the ages of the father and his son is 99. If the age of the son is added to the inverted age of the father, the sum is 72. If the inverted age of the son is subtracted from the age of the father, the difference is 22. How old is his son?

a) 25years old

b) 35years old

c) 30years old

d) 20years old

24. Determine the sum of the 39th term of the triangular numbers, 35th term of the square numbers, 47th term of the pentagonal numbers, and 20th term of the hexagonal number.

a) 7075

b) 6175

c) 6075

d) 7175

25. A given alloy contains 20% copper and 5% tin. How many pounds of copper and of tin must be melted with 100 lbs of the given alloy to produce another alloy analyzing 30% copper and 10% tin. All percentages are by weight.

a) 17.5lbs of Copper and 7.5lbs of Tin

b) 7.5lbs of Copper and 17.5lbs of Tin

c) 8.5lbs of Copper and 18.5lbs of Tin

d) 18.5lbs of Copper and 8.5lbs of Tin